REMARKS

This responds to the Office Action mailed on February 16, 2006.

Claims 1, 14-23, and 32-35 are amended and claims 37-44 are added; as a result, claims 1-44 are now pending in this application.

§103 Rejection of the Claims

Claims 1-6, 8-25 and 27-36 were rejected under 35 USC § 103(a) as being unpatentable over *Lyles et al.* (U.S. Patent 6,377,583B1) in view of *Black et al.* (U.S. Publication 2003/0174722 A1). Several claims have been amended for clarity and it is submitted that the currently pending claims are patentable over the cited references for at least the below noted reasons.

Independent claim 1 is directed to a flow control hub. The hub includes a scoreboard memory device to maintain flow control status for a plurality of flows. Each of the flows is identified by an associated index in the scoreboard memory. An address decoder receives a flow control message from a destination desiring to modify flow of data thereto and determines an associated flow and scoreboard memory index for the flow control message. An updater updates the flow control status in the scoreboard memory device based on the received flow control message.

The Applicant submits that neither *Lyles et al.* nor *Black et al.*, whether taken alone or in any reasonable combination, disclose or suggest the flow control hub recited in claim 1. The Applicant submits that *Lyles et al.* do not disclose any of the elements (a scoreboard memory device, an address decoder, an updater) of claim 1. In fact, the Examiner acknowledges that *Lyles et al.* do not teach a scoreboard memory device or an updater, as required by claim 1.

Lyles et al. disclose a system for shaping traffic flow by utilizing data paths, control paths or both for transmitting the data. The system receives cells and stores (queues) the cells in data memory 27 based on a free list 52. A fill cell module 51 generates an arrival messages that includes a pointer to the location it is stored in memory as well as a circuit index that identifies the VC or flow of the data. The arrival message is sent to a flow control unit 55 that determines

whether the cell should be queued for transmission on a data path, control path, or both for rate shaping. The flow control unit 55 sends an addCell message indicating what path the data is to be sent on to a queue control unit. There is clearly no disclosure or suggestion of flow control messages, let alone a flow control hub having an address decoder, updater and scoreboard memory for maintaining a flow control status for a plurality of flows, as required by claim 1.

The Examiner appears to contend that *Lyles et al.* teach a memory device storing flow control status as he states that "a memory device (see col. 10, lines 51 and 55; Figure 3, '27'). This device maintains flow control status (see 'check traffic shaping status'; col. 10, lines 60-61) for a plurality of flows". The Applicant submits that the Examiners contention is erroneous. The memory 27 referred to by the Examiner stores received cells not flow control status based on flow control messages. Moreover, the traffic shaping status referred to by the Examiner is not stored in or based on the memory 27. Accordingly, in addition to not disclosing a scoreboard memory as acknowledged by the Examiner, the Applicant submits that *Lyles et al.* do not disclose or suggest any type of memory storing flow control status as required by claim 1.

The Examiner appears to contend that *Lyles et al.* teach an address decoder because it "teaches receiving a flow control message (see 'arrival message') and to determine the associated index for it (see col. 10, line 56)". The Applicant submits that the Examiners contention is erroneous. The arrival message that the Examiner seems to equate to a flow control message includes a circuit index for the cell and a pointer to the location of the cell in data memory (see col. 10 lines 53-56). As the arrival message already includes a circuit index there is clearly no determination of the associated index, let alone an address decoder for determining the associated index of the flow control message, as required by claim 1. Moreover, the circuit index included in the arrival message is associated with a virtual circuit or flow for the data cell received and is not a flow control message from a destination desiring to modify flow of data thereto, as required by claim 1. Accordingly, the Applicant submits that *Lyles et al.* do not disclose or suggest an address decoder to receive a flow control message from a destination desiring to modify flow of data thereto or to determine the associated flow and index for the flow control message, as required by claim 1.

The Examiner appears to contend that *Lyles et al.* teach flow control status stored in memory being updated as he states "the flow control status is updated based on the received flow

control message (see 'determined', col. 10, lines 64-65; col. 11, lines 4-6)". The Applicant submits that this contention is clearly erroneous. The determination referred to by the Examiner is a determination whether to queue the cell in the data path, control path or both. This determination has nothing to do with the flow control status of a flow and the determination is not made based a flow control message received from a destination, as required by claim 1. Accordingly, in addition to not disclosing an updater as acknowledged by the Examiner, the Applicant submits that *Lyles et al.* do not disclose or suggest updating the flow control status based on flow control messages, as required by claim 1.

The Examiner appears to rely on *Black et al.* for disclosing the acknowledged deficiencies in the teaching of *Lyles et al.*, namely a scoreboard memory and an updater. The Applicant submits that *Black et al.* do not disclose or suggest the acknowledged deficiencies or the other deficiencies noted above.

The Examiner appears to contend that *Black et al.* disclose a scoreboard memory to maintain flow control status for a plurality of flows and an updater to update the flow control status based on a received flow control message because "Black et al. teaches a device (see Figure 4) where the 'scoreboard circuitry' reads messages and uses the information therein regarding the identity of a sending port and the status codes in the message to update the status entry for the port (see [0082])". The status tracked in the scoreboard memory of *Black et al.* is whether the ports are busy (already communicating with other ports). The tracking is related to specific ports and is not related to specific flows as required by claim 1.

Moreover, there is no disclosure or suggestion of flow control messages from destinations desiring to modify the flow of data thereto, determining an associated flow and scoreboard index, or updating the scoreboard memory, as required by claim 1.

For at least the reasons discussed above, the Applicant submits that neither *Lyles et al.* nor *Black et al.*, whether taken alone or in any reasonable combination, disclose or suggest the flow control hub recited in claim 1.

Furthermore, the Applicant submits that the motivation provided by the Examiner for combining the references is erroneous. The Examiner claims that the motivation for combining the references would be "to obtain an inexpensive FCAL system with reduced components ('bufferless') and increased bandwidth". However, *Lyles et al.* is about rate shaping of output

queues (buffers) so that removing the queues to create a bufferless system would diminish if not destroy the *Lyles et al.* system.

The Applicant submits that for at least the above noted reasons claim 1 is clearly patentable over the combination of *Lyles et al.* and *Black et al.* Claims 2-6 and 8-13 depend from claim 1 and are therefore submitted to be patentable over the combination of *Lyles et al.* and *Black et al.* for at least the same reasons discussed above with respect to claim 1 and for the further features recited therein.

Independent claim 14 is directed to a flow control hub. The hub includes a scoreboard memory device to maintain flow control status for a plurality of flows, wherein each of the flows is identified by an associated index in the scoreboard memory. A selector selects a flow having a flow control status to process. A message generator generates a flow control message for the selected flow based on the flow control status maintained in said scoreboard memory device for the selected flow.

The Applicant submits that neither *Lyles et al.* nor *Black et al.*, whether taken alone or in any reasonable combination, disclose or suggest the flow control hub recited in claim 14. The Applicant submits that *Lyles et al.* do not disclose any of the elements (a scoreboard memory device, a selector, a message generator) of claim 14. In fact, the Examiner acknowledges that *Lyles et al.* do not teach a scoreboard memory device, as required by claim 14.

The Examiner appears to contend that *Lyles et al.* teach a memory device storing flow control status as he states that "a memory device (see col. 10, lines 51 and 55; Figure 3, '27') and maintains flow control status (see col. 10, lines 60-61) for a plurality of flows". The Applicant respectfully submits that the Examiners contention is erroneous. As discussed above with respect to claim 1, the memory 27 stores received cells not flow control status based on flow control messages as required by claim 14.

The Examiner appears to contend that *Lyles et al.* disclose a selector as he states "selection of the queue is based on the priority of the related flow (see col. 9, lines 51-52)". The Applicant respectfully submits that the Examiners contention is erroneous. The selection referred to by the Examiner relates to what queue the cells should be added to. The selection has

nothing to do with flows or flow control statuses, let alone selecting a next flow having a flow control status to be processed as required by claim14.

The Examiner appears to contend that *Lyles et al.* disclose a message generator because it "teaches the 'cell flow control unit 55' which sends a message for a particular flow based on the status (see col. 11, lines 1-4)". The Applicant respectfully submits that this contention is clearly erroneous. The message that is generated and sent by the flow control unit 55 to a queue control unit 58 is an addCell message that identifies whether the cell is to be queued in the data path, control path or both, and is not a flow control message as required by claim 14. Moreover, the message is not generated from a flow control status stored in a scoreboard memory as required by claim 14.

The Examiner appears to rely on *Black et al.* for disclosing the acknowledged deficiencies in the teaching of *Lyles et al.*, namely a scoreboard memory. The Applicant submits that *Black et al.* do not disclose or suggest the acknowledged deficiencies or the other deficiencies noted above.

The Examiner appears to contend that *Black et al.* disclose a scoreboard memory to maintain flow control status for a plurality of flows as he states "Black et al. teaches a device (see Figure 4) where the 'scoreboard circuitry' reads messages and uses the information therein regarding the identity of a sending port and the status codes in the message to update the status entry for the port (see [0082])". The status tracked in the scoreboard memory of *Black et al.* is whether the ports are busy (already communicating with other ports). The tracking is related to specific ports and is not related to specific flows as required by claim 14.

The Examiner does not rely on *Black et al.* for disclosing a selector or a message generator and the Applicant submits that it doesn't disclose or suggest these elements, as required by claim 14.

For at least the reasons discussed above, the Applicant submits that neither *Lyles et al.* nor *Black et al.*, whether taken alone or in any reasonable combination, disclose or suggest the flow control hub recited in claim 14.

Furthermore, the Applicant submits that the motivation provided by the Examiner for combining the references is erroneous as discussed above with respect to claim 1.

The Applicant submits that for at least the above noted reasons claim 14 is clearly patentable over the combination of *Lyles et al.* and *Black et al.* Claims 15-18 depend from claim 14 and are therefore submitted to be patentable over combination of *Lyles et al.* and *Black et al.* for at least the same reasons discussed above with respect to claim 14 and for the further features recited therein.

Independent claim 19 is directed to a method including maintaining a flow control status for a plurality of flows in a memory device, wherein each of the flows is identified by an associated index in the memory device. A next flow having a flow control message to process is selected. A flow control message is generated for the selected flow based on the flow control status maintained in the memory device for the selected flow.

The Applicant submits that claim 19 is patentable over combination of *Lyles et al.* and *Black et al.* for at least similar reasons to those discussed above with respect to claim 14. Claims 20-22 depend from claim 19 and are submitted to be patentable for at least the same reasons discussed with respect to claim 19 and for the further features recited therein.

Independent claim 23 is directed to a method including maintaining a flow control status for a plurality of flows in a memory device, wherein each of the flows is identified by an associated index in the memory device. A flow control message is received from a destination desiring to modify flow of data thereto. A determination of an associated flow and memory device index for the received flow control message is made. The flow control status for the associated flow maintained in the memory device is updated based on the received flow control message.

The Applicant submits that claim 23 is patentable over combination of *Lyles et al.* and *Black et al.* for at least similar reasons to those discussed above with respect to claim 1. Claims 24, 25, and 27-31 depend from claim 23 and are submitted to be patentable for at least the same reasons discussed with respect to claim 23 and for the further features recited therein. The Applicant respectfully submits that the rejection of claims 23-25 and 27-31 should accordingly be withdrawn.

Independent claim 32 is directed to a store and forward device that includes a plurality of Ethernet cards. The Ethernet cards include a plurality ingress ports to receive data from external sources and transmit the data based on flow of the data and a plurality of egress ports to receive data from at least a subset of the plurality of flows. Each ingress port has a plurality of ingress queues associated with a plurality of flows. Transmission of data from a particular queue is controlled at least in part by a flow control status associated with the queue. Each egress port has an egress queue for holding the data prior to transmission. Each egress queue issues flow control messages based at least in part on capacity of the egress queue. The device also includes a backplane to connect the plurality of Ethernet cards together. A flow control hub receives flow control messages from the egress ports, maintains a flow control status for each flow based on the received flow control messages, selects a next flow having a flow control status to process, and generates and forwards flow control message to queue associated with the selected flow.

The Applicant submits that claim 32 is patentable over the cited reference for reasons similar to those addressed above with respect to claims 1 and 14. Claims 33 and 34 depend from claim 32 are therefore submit to be patentable for at least the same reasons and for the further features recited therein. Accordingly, the Applicant submits that the Examiner should withdraw the rejection.

Independent claim 35 is directed to a device that includes a plurality of ingress ports to receive data from external sources and to store the data in a plurality of ingress queues. The ingress queues are associated with flows and the flows are associated with at least some subset of source, destination, and priority. A plurality of egress ports receive data from at least a subset of the plurality of ingress queues and store the data in a plurality of egress queues prior to transmission. The egress ports issue flow control messages to control flow of data to the egress ports based at least in part on capacity of the egress queues. A flow control hub receives the flow control messages from the egress ports, records a flow control status for an associated flow in a scoreboard memory based on the received flow control message, discards the received flow control message subsequent to recording the flow control status, selects next flow having a valid flow control status to process, generates a flow control message for the next flow, and forwards the generated flow control message to ingress ports associated with the next flow.

The Applicant submits that neither *Lyles et al.* nor *Black et al.*, whether taken alone or in any reasonable combination, disclose or suggest the device recited in claim 35. For example, neither reference discloses or suggests a flow control hub as recited. That is, neither reference discloses or suggests receiving flow control messages from egress ports, recording the flow control status for an associated flow in a scoreboard memory, discarding the flow control message after updating the scoreboard memory, selecting a next flow having a valid flow control status to process, generating a flow control message for the next flow, or forwarding the generated flow control message to ingress ports associated with the next flow. In addition, neither reference discloses or suggests egress ports transmitting flow control messages to control the flow of data thereto, as required by claim 35. In fact, neither reference deals with flow control based on flow control messages from the egress ports.

Rather *Lyles et al.* disclose a system for shaping traffic flow by utilizing data paths, control paths or both for transmitting the data based on parameters associated with received cells and doesn't disclose or suggest flow control messages from egress ports or a flow control hub. *Black et al.* disclose a bufferless FCAL system and accordingly would have no need to generate flow control messages or to have a flow control hub.

For at least these reasons, the Applicant submits that claim 35 is clearly patentable over the combination of *Lyles et al.* and *Black et al.* Claim 36 depends from claim 35 and is therefore submitted to be patentable over combination of *Lyles et al.* and *Black et al.* for at least the same reasons discussed above with respect to claim 35 and for the further features recited therein.

Claims 7 and 26 were rejected under 35 USC § 103(a) as being unpatentable over *Lyles, et al.* (U.S. Patent 6,377,583B1) in view of *Black et al.* (U.S. Publication 2003/0174722 A1), in further view of *Davies, et al.* (U.S. Patent 5,819,111). It is submitted that these claims are patentable over the cited references for at least the below noted reasons.

Claim 7 depends from claim 1. The Examiner has not relied on *Davies et al.* for disclosing features of claim 1 that were deficient in the teachings of *Lyles et al.* and *Black et al.* The Applicant submits that *Davies et al.* do not disclose or suggest the deficiencies from the

teachings of *Lyles et al.* and *Black et al.* Accordingly, claim 7 is clearly patentable over the cited references.

Moreover, the Applicant submits that *Davies et al.* do not disclose or suggest an updater making no changes to the flow control status if index has same flow control status as received flow control message, as required by claim 7. The Examiner contends that "*Davies et al.* teaches a flow control (see Title) system where if a buffer is not full, the *flow control state* variable is *unchanged* (see col. 8, lines 5-13)". The Applicant submits that even if the Examiner's contention regarding what *Lyles et al.* teaches is correct that it has nothing to do with the features of claim 7. That is, the passage the Examiner refers to discusses not changing a flow control status if a buffer is not full. As the system is checking to see if a buffer is empty it clearly does not disclose or suggest determining if a flow control status in a flow control message is the same as the flow control status in memory, and making no changes if they are the same. For at least this additional reason, the Applicant submits that claim 7 is patentable over the cited references.

Additionally, the Applicant submits that the Examiner has not provided sufficient motivation for combining the references as he has not pointed to any motivation in any of the references for this combination.

Claim 26 depends from claim 23. The Examiner has not relied on *Davies et al.* for disclosing features of claim 23 that were deficient in the teachings of *Lyles et al.* and *Black et al.* The Applicant submits that *Davies et al.* do not disclose or suggest the deficiencies from the teachings of *Lyles et al.* and *Black et al.* Accordingly, claim 26 is clearly patentable over the cited references.

Additionally the Applicant submits that claim 26 is further patentable over *Lyles et al.* for at least similar reasons to those discussed above with respect to claim 7.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (215-230-5511) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 50-3228.

Respectfully submitted,

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By their Representatives,

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Shellie Bailey

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